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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/526,225

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Yoshikazu Kakura

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

NGUYEN, LEON VIET Q

ART UNIT

PAPER NUMBER

2611

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/526,225	Applicant(s) KAKURA ET AL.	
	Examiner LEON-VIET Q. NGUYEN	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/1/05, 8/31/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 8/31/06 was filed after the mailing date of 8/31/06. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1, 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the background of applicant's specification (hereby referred to as the background) in view of Xiao et al ("A Novel MC-2D-CDMA Communication Systems and Its Detection Methods" 2000 IEEE International Conference on Communications, Publication Date: 2000 Volume: 3, On page(s): 1223-1227).**

Re claim 1, the background teaches a radio transmitter-receiver wherein a pilot symbol that has undergone M-chip spreading on a frequency axis (the vertical axis in fig. 2) and N-chip spreading on a time axis (the horizontal axis in fig. 2) by means of a spreading code having an $M \times N$ chip length (page 3 line 26 – page 4 line 2) where M and N are any integers greater than or equal to 2 (fig. 2, page 3 line 26 – page 4 line 2) is used in the transmitter (it is well known that spreading codes are used in the transmitter portion of a system), and in the receiver, a spreading code that is not used in spreading a pilot signal is used as a despreading code to despread a received signal and then estimate noise and interference power (page 2 lines 18-21. One of ordinary skill in the art would have found it obvious to implement CDMA techniques in a MC-2D-CDMA system, which is based on CDMA).

The background fails to teach wherein said spreading code that is used in spreading a pilot symbol and said despreading code that is used in despreading are assigned so as to be orthogonal at least in only N chips on the time axis and/or in only M chips on the frequency axis. However Xiao teaches spreading codes which are orthogonal at least in only N chips on the time axis and/or in only M chips on the frequency axis (page 1224 right side second paragraph).

Therefore taking the combined teachings of the background and Xiao as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Xiao into the apparatus of the background. The motivation to combine Xiao and the background would be to provide higher capacity

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(page 1223 left side third paragraph of Xiao). Furthermore it is well known that utilizing orthogonality reduces interference between signals.

Re claim 2, the modified invention of the background teaches a radio transmitter-receiver wherein at least one of code that is orthogonal to said despreading code that is used in despreading even if only in M chips on the frequency axis and/or code that is orthogonal to said despreading code that is used in despreading even if only in N chips on the time axis (page 1224 right side second paragraph) is preferentially assigned as said spreading code that is used in spreading pilot symbols (page 1224 right side second paragraph. The Walsh code is a spreading code).

Re claim 7, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be obvious and necessary to have a method of using the apparatus as claimed in claim 1.

3. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the background of applicant's specification (hereby referred to as the background) and Xiao et al ("A Novel MC-2D-CDMA Communication Systems and Its Detection Methods" 2000 IEEE International Conference on Communications, Publication Date: 2000 Volume: 3, On page(s): 1223-1227) in view of Uesugi et al (US20040042386).

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Re claim 3, the modified invention of the background fails to teach a radio transmitter-receiver comprising:

means for detecting whether either of channel fluctuation on the frequency axis or channel fluctuation on the time axis is prominent; wherein:

code that is orthogonal even if only in M chips on the frequency axis is assigned as said spreading code that is used in spreading a pilot symbol when channel fluctuation is prominent on the time axis; and

code that is orthogonal even if only in N chips on the time axis is assigned as said spreading code that is used in spreading a pilot symbol when channel fluctuation is prominent on the frequency axis.

However Uesugi teaches detecting whether either of channel fluctuation on the frequency axis or channel fluctuation on the time axis is prominent (¶0051, ¶0054. The symbol portion of the frequency and time axis is maximum. Reduced orthogonality of time axis direction under intensive time fluctuation) wherein:

code that is orthogonal even if only in M chips on the frequency axis is assigned as said spreading code that is used in spreading a pilot symbol (page 1224 right side second paragraph of Xiao) when channel fluctuation is prominent on the time axis (¶0051. The symbol portion of the time axis is maximum); and

code that is orthogonal even if only in N chips on the time axis is assigned as said spreading code that is used in spreading a pilot symbol (page 1224 right side

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second paragraph of Xiao) when channel fluctuation is prominent on the frequency axis (¶0051. The symbol portion of the time axis is maximum).

Therefore taking the modified teachings of the background and Xiao with Uesugi as a whole, It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Uesugi into the apparatus of the background and Xiao. The motivation to combine the background, Xiao, and Uesugi would be to optimize the axis direction of every code while maintaining orthogonality (¶0054 of Uesugi).

Re claim 4, the modified invention of the background teaches a radio transmitter-receiver wherein delay spread is used as an index of channel fluctuation on the frequency axis (¶0054 of Uesugi, the long delay wave is interpreted to be a delay spread).

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the background of applicant's specification (hereby referred to as the background), Xiao et al ("A Novel MC-2D-CDMA Communication Systems and Its Detection Methods" 2000 IEEE International Conference on Communications, Publication Date: 2000 Volume: 3, On page(s): 1223-1227) and Uesugi et al (US20040042386) in view of Sudo (US20040071078).

Re claim 5, the modified invention of the background fails to teach a radio transmitter-receiver wherein a coherent band is used as an index of channel fluctuation on the frequency axis.

However Sudo teaches wherein a coherent band is used as an index of channel fluctuation (¶0423, the coherent detection is interpreted to correspond to a coherent band) on the frequency axis (¶0431).

Therefore taking the modified teachings of the background, Xiao, and Uesugi with Sudo as a whole, It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Sudo into the apparatus of the background, Xiao, and Uesugi. The motivation to combine the background, Xiao, Sudo and Uesugi would be to improve the error rate characteristic with almost no lowering of transfer efficiency (¶0424 of Sudo).

5. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over the background of applicant's specification (hereby referred to as the background), Xiao et al ("A Novel MC-2D-CDMA Communication Systems and Its Detection Methods" 2000 IEEE International Conference on Communications, Publication Date: 2000 Volume: 3, On page(s): 1223-1227) and Uesugi et al (US20040042386) in view of Sumasu et al (US20040028007).

Re claim 6, the modified invention of the background fails to teach a radio transmitter-receiver wherein Doppler frequency is used as an index of channel fluctuation on the time axis.

However Sumasu teaches wherein Doppler frequency is used as an index of channel fluctuation (page 7, claim 8) on the time axis (page 6, claim 1).

Therefore taking the modified teachings of the background, Xiao, and Uesugi with Sumasu as a whole, It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature of Sumasu into the apparatus of the background, Xiao, and Uesugi. The motivation to combine the background, Xiao, Sumasu and Uesugi would be to minimize the occurrence of burst errors (§0026 of Sumasu).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON-VIET Q. NGUYEN whose telephone number is (571)270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Q Nguyen/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611